



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,243	05/30/2001	Robert L. Brainard	50540	8839

21874 7590 09/16/2003

EDWARDS & ANGELL, LLP
P.O. BOX 9169
BOSTON, MA 02209

EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 09/16/2003

60

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/870,243

Applicant(s)

BRAINARD ET AL.

Examiner

Sin J Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 7-19 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claim Objections

2. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 3, applicants recite "wherein the one or more photoacid generator compounds are present in a concentration of at least about 5 weight percent based on weight of total solids of the photoresist composition". This limitation fails to further limit the subject matter of claim 1 (claim 1 recites "wherein the one or more photoacid generator compounds are present

in a concentration of at least 5 weight percent based on weight of total solids of the photoresist composition.”).

Claim Rejections - 35 USC § 102

3. Claims 1-3 and 7-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (6,013,447).

Chen teaches (col.1, lines 7-17, col.3, lines 3-12, lines 15-22) a positive tone chemically amplified resist system for use in mid-UV, deep-UV, *extreme UV*, X-ray, and e-beam lithography comprising (a) a polymer resin composition (a blend of at least two miscible aqueous base soluble polymer resins, one of which is partially protected with a high activation energy protecting group and the other of which is partially protected with a low activation energy protecting group), (b) and acid generator, and (c) a solvent. As the polymer resin protected with a high activation energy protecting group, Chen teaches (Example 5) a terpolymer consisting of *hydroxystyrene*, *styrene*, and *tertiary butyl acrylate*, and as the polymer resin protected with a low activation energy protecting group, Chen teaches (col.4, lines 53-56, lines 65-57) a polymer protected with methoxycyclohexanyl *ketal* group. Chen teaches (col.7, lines 10-14) that his chemically amplified resist system comprises from about 0.005 to about 10 wt% of the acid generator. Since 10 wt% is shown as the higher end of the taught range, it is the Examiner's position that one of ordinary skill in the art would immediately envisage using 10 wt% of the acid generator in Chen's chemically amplified resist system. Although in Example 5, Chen spin-coats his resist solution onto a silicon wafer and then

Art Unit: 1752

exposure it to DUV light, since Chen clearly teaches that his chemically amplified resist system is for use in mid-UV, deep-UV, extreme UV, X-ray, and e-beam, one of ordinary skill in the art would immediately envisage exposing Chen's resist coated on the silicon wafer to extreme UV. Therefore, the prior art teaches present inventions of claims 1-3, 7-10, 16-19.

With respect to present claims 11 and 13-15, Chen teaches (Example 5) di(t-butylphenyl)iodonium perfluorooctane sulfonate as one of the examples for his photoacid generator. Therefore, the prior art teaches present inventions of claims 11 and 13-15.

With respect to present claim 12, Chen teaches (col.6, lines 7 and 8) that nitrobenzyl compound (as well as onium salts, sulfonates, carboxylates) can also be used as his photoacid generator. Therefore, it is the Examiner's position that one of ordinary skill in the art would immediately envisage using nitrobenzyl compound as Chen's photoacid generator. Therefore, the prior art teaches present invention of claim 12.

4. Claims 1-3 and 11-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Barclay et al (6,492,086 B1).

In Example 8 (see also, col.1, lines 6-11), Barclay teaches a chemically-amplified positive-acting photoresist composition comprising phenol/styrene/2-methyladamantyl methacrylate terpolymer and di-t-butyl phenyl iodonium camphorsulfonate in the amount of solid ratio of 4.72 *which is rounded off to 5* (the 5 wt% of present claim 1 has only one significant figure, and therefore, Barclay's 4.72 is rounded off to 5 to make it into one

Art Unit: 1752

significant figure, too). Barclay spin-coats the photoresist composition onto a silicon wafer and then expose it with a KrF laser (248 nm). Barclay furthermore teaches (col.13, lines 33-36) that his resists also will be useful for exposure with E-beam exposure, and extreme UV exposure such as sub-50 nm or sub-20 nm exposure, particularly 13 nm exposure. Based on this teaching, it is the Examiner's position that one of ordinary skill in the art would immediately envisage exposing Barclay's photoresist-coated silicon wafer in Example 8 to extreme UV. Therefore, the prior art teaches present inventions of claims 1-3, 9, 11, 13, and 16-18.

With respect to present claims 12, 14, and 15, Barclay teaches (col.11, lines 29-50, col.12, lines 19-26) that as his photoacid generator, N-[(perfluorooctanesulfonyl)oxy]-5-norbornene-2,3-dicarboximide (a non-ionic compound) as well as iodonium compounds having anions of perfluorooctanesulfonate or perfluorobutanesulfonate can also be used. Therefore, the prior art teaches present inventions of claims 12, 14, and 15.

Response to Arguments

5. Applicants argue that Chen is insufficient to sustain the present rejections since all the examples of Chen report imaging with 248 nm radiation and have photoacid generator compounds present at less than 5 wt%. However, as already explained above, Chen clearly teaches that his chemically amplified resist system is for use in mid-UV, deep-UV, *extreme UV*, X-ray, and e-beam, and therefore, one of ordinary skill in the art would immediately envisage exposing Chen's resist coated on the silicon

Art Unit: 1752

wafer to extreme UV according to his teaching. Also, since Chen teaches that his chemically amplified resist system comprises from about 0.005 to about 10 wt% of the acid generator, and since 10 wt% is shown as the higher end of the *taught range*, one of ordinary skill in the art would immediately envisage using 10 wt% of the acid generator in Chen's chemically amplified resist system. Besides, patentee, in the same manner as applicants, is not limited in his teaching to only the exemplified subject matter. See In re Mills and Palmer, 176 USPQ 196.

Applicants also argue that Barclay does not anticipate present claim 1 anymore because claim 1 has been amended to require at least 5 wt % of the photoacid generator whereas Barclay is cited for a composition containing a solid ratio of 4.72 of di-t-butyl phenyl iodonium camphorsulfonate. However, as explained above, the "5 wt%" of present claim 1 has only one significant figure, and therefore, Barclay's 4.72 is also rounded off to 5 to make it into one significant figure. Thus, Barclay still anticipates present invention of claim 1.

For the reasons stated above, present rejections still stand.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

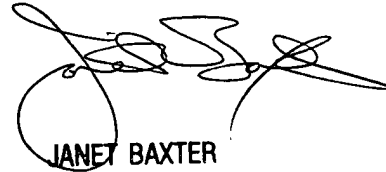
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Art Unit: 1752

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. Lee

S. Lee
9/10/03



JANET BAXTER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700